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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,737	MAENO, KURATO	
	Examiner	Art Unit	
	John B. King	2435	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4-6,8,9,11-13,15,16,18-20,22 and 24-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4-6,8,9,11-13,15,16,18-20,22 and 24-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to applicant's amendment filed on May 18, 2011.

2. Claims 2, 4-6, 8, 9, 11-13, 15, 16, 18-20, 22 and 24-27 are pending in this application.

Response to Arguments

3. Applicant's amendments are accepted as overcoming the Claim Objections of the previous Office Action dated December 22, 2010.

4. Applicant's arguments filed May 18, 2011 have been considered but they are not fully persuasive. In the remarks applicant argues:

I) The cited prior art does not teach "use of a plurality of PN code sequences, with one of the PN code sequences being assigned to all of a row or column and another of the PN code sequences being assigned to all of another row or column."

The Examiner respectfully disagrees. The newly amended claims are considered as indefinite based on the 35 U.S.C. 112, second paragraph, rejection as set forth below. Based on the indefiniteness of the claims and the Examiner's best interpretation of the claims, the cited references do teach the limitations that are in question. Cox, Figure 1 and col. 4 lines 39-65, teaches watermarking using multiple PN codes i.e. one PN code is used for each symbol (bit) of the watermark data. Cox, Figure 7, further teaches putting the PN codes in different rows and columns. Furthermore, the Suzaki reference, in Figure 3 and paragraphs 60-61, also teaches having codes that are used to represent the height and width (column and row) of the watermark signal.

Examiner Notes

5. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 2, 5, 8, 15, 18, 20, 25, and 27** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claims 2, 5, 15, 20, and 25 recite “assigning one of the PN code sequences to all of a row or column and assigning another of the PN code sequences to all of another row or column”, which renders the claim as indefinite. This limitation appears to state that each symbol on a row will be assigned the same PN code i.e. all 0’s and all 1’s will be given the same PN code. If all of the symbols on a row are given the same PN code it would be impossible to reconstruct the intended watermark later. For the purposes of examination, the examiner will interpret this limitation as assigning a PN code for each symbol which is the standard way that PN codes are used for watermarking.

9. Claims 8, 18, and 27 recite "wherein a first one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a first row or column and a second one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a second row or column" or similar limitations which render the claims as indefinite. This limitation appears to recite detecting an embedded watermark when each symbol on a row has been assigned the same PN code i.e. all 0's and all 1's will be given the same PN code. If all of the symbols on a row are given the same PN code it would be impossible to reconstruct the intended watermark later. For the purposes of examination, the examiner will interpret this limitation as detecting an embedded watermark when a PN code has been assigned for each symbol which is the standard way that PN codes are used for watermarking.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claims 2, 4-6, 8-9, 11-13, 15-16, 18-20, and 25-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzaki (US Pre-Grant Publication 2003/0021442) in view of Cox et al. (US Patent 5915027) hereinafter referred to as Cox.

As per claim 2, Suzaki discloses a watermark information embedding apparatus, comprising:

a document image generating section for generating a document image **(Figure 1 and paragraphs 42-43, Suzaki teaches a document image formation portion to generate a document image.)**;

generating representational watermark information and generating a watermark image in which the diffused units of watermark information are redundantly denoted by dot patterns that are repeated at a plurality of locations **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to watermark an image from watermark information. Suzaki, Figure 11, also teaches that watermark information is repeated throughout the document image.)**;

and a synthesizing section for overlapping the document image and the watermark image so as to generate a watermarked document image **(paragraph 45, Suzaki teaches obtaining a watermark document image by combining the watermark document and the document.)**;

and a printer that prints the watermarked document image on a recording medium **(paragraphs 45-46, Suzaki teaches generating the watermarked document and printing the watermarked document.)**,

Suzaki also discloses the use of codes to form the watermark **(paragraph 56, Suzaki teaches the use of codes.)**

However, Suzaki does not specifically teach the use of PN codes.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

wherein the units of watermark information are represented by bits **(The watermark information must be stored as bits if it is to be used digitally.)**,

and wherein by representing the respective bit by the one of the PN code sequences if the respective bit has a first value and by representing the respective bit by a modified version of the one of the PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code or a modified version of the PN code.)**,

and wherein the watermark generating section uses the plurality of PN code sequences so as to diffuse units of watermark information by assigning one of the PN code sequences to all of a row or column and assigning another of the PN code sequences to all of another row or column **(Cox, Figure 7, teaches using the plurality of PN codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns. Suzaki, Figure 3 and paragraphs 60-61, further teaches the codes being used to represent the height and width (column and row) of the watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 4, Suzaki in view of Cox disclose the watermark information embedding apparatus according to claim 2, wherein the PN code generating section generates an array of two-dimensional PN code sequences in a row direction and a column direction **(Suzaki, paragraph 56, teaches the generation of N-dimensional codes where N >=2 and Suzaki, paragraphs 60-61, teaches that the two-dimensional codes represent the height and width (column and row) of the watermark image. Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**

As per claim 5, Suzaki discloses a watermark information embedding apparatus comprising:

a document image generating section for generating a document image **(Figure 1 and paragraphs 42-43, Suzaki teaches a document image formation portion to generate a document image.)**;

a code generating section for generating two dimensional codes that together form a three-dimensional code group representing a row direction and a column direction **(paragraphs 56-60, Suzaki teaches generating N-dimensional codes that represent the height and width (column and row) of the watermark signal.)**;

a watermark image generating section for diffusing units of watermark information using the two-dimensional codes **(paragraphs 56-60, Suzaki teaches the use of N-dimensional codes to generate a watermark image.)**,

generating a sequence of representational watermark information, and generating a watermark image in which the diffused units of watermark information are redundantly denoted by dot patterns that are repeated at a plurality of locations **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to watermark an image from watermark information. Suzaki, Figure 11, also teaches that watermark information is repeated throughout the document image.)**,

and a synthesizing section for overlapping the document image and corresponding watermark image so as to generate a watermarked document image **(paragraph 45, Suzaki teaches obtaining a watermark document image by combining the watermark document and the document.)**;

and a printer that prints the watermarked document image on a recording medium **(paragraphs 45-46, Suzaki teaches generating the watermarked document and printing the watermarked document.)**

However, Suzaki does not specifically state the use of a multipage document or watermarking a multipage document.

It would have been obvious to one of ordinary skill in the art at the time of the invention to insert a watermark into a multipage document. Suzaki, paragraph 56, teaches the use of N-dimensional (N >= 2) codes being used to insert a watermark into a single page document. If the two-dimensional codes represent the height and width of the watermark signal (page) as shown in Suzaki paragraph 60, then it would be obvious for the third dimension to be the page number and to insert a watermark into that multipage document.

However, Suzaki also does not specifically state the codes to be used are PN codes.

Cox discloses a PN code generating section for generating an array of PN sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

wherein the watermark generating section uses the plurality of PN code sequences so as to diffuse units of watermark information by assigning one of the PN code sequences to all of a row or column and assigning another of the PN code sequences to all of another row or column **(Cox, Figure 7, teaches using the plurality of PN codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns. Suzaki,**

Figure 3 and paragraphs 60-61, further teaches the codes being used to represent the height and width (column and row) of the watermark signal.),

wherein the units of watermark information are represented by bits **(The watermark information must be stored as bits if it is to be used digitally.)**,

and wherein by representing the respective bit by the at least one of the PN code sequences if the respective bit has a first value and by representing the respective bit by a modified version of the at least one PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 6, Suzaki in view of Cox discloses the watermark information embedding apparatus according to claim 2, wherein there is at least one dot pattern representing special watermark information **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to contain special information.)**

As per claim 8, Suzaki discloses a watermark information detecting apparatus for extracting units of watermark information **(paragraphs 47-50, Suzaki teaches a watermark information detection device.)**,

which is diffused by a plurality of codes and redundantly denoted by dot patterns that are repeated at a plurality of locations in a watermark image **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to watermark an image from watermark information using N-dimensional codes. Suzaki, Figure 11, also teaches that watermark information is repeated throughout the document image.)**,

from a document, comprising: a scanner for scanning the document to produce a scanned image **(Suzaki, paragraph 49, teaches scanning an image to retrieve the watermark information.)**;

and a watermark information detector **(paragraph 18-19, Suzaki teaches detection of the watermark by use of the dot patterns.)**,

which detects the diffused watermark information from the scanned image to extract the watermark image from the document **(paragraph 18-19, Suzaki teaches detection and extraction of the watermark image.)**,

and which estimates an area occupied by the watermark information based on the watermark image and the plurality of codes **(paragraphs 97-99, Suzaki teaches calculating the watermark area.)**

However, Suzaki also does not specifically state the use of PN codes.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the plurality of PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

wherein the units of watermark information are represented by bits **(The watermark information must be stored as bits if it is to be used digitally.)**,

and wherein each bit of watermark information is diffused by representing the respective bit by one of the PN code sequences if the respective bit has a first value and by representing the respective bit by a modified version of the PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code.)**;

wherein the watermark information detector calculates correlation values using different PN code sequences, detects a correlation peak value of each PN code sequence, and estimates row addresses and column addresses according to the correlation peak values **(Cox, Figure 3, teaches performing correlations on the watermarked image to extract the watermark signal. Suzaki, paragraphs 19, 103-104, further teaches the use of a filter to detect the watermark information on the watermarked document. Figures 17 and 18 also teach the recovering of the codes (row and column) that were used to embed the watermark. Therefore, the**

combination teaches recovering the PN codes to determine the rows and columns that contain the watermark information.),

and wherein a first one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a first row or column and a second one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a second row or column **(Cox, Figure 3 and col. 5 lines 35-54, teaches performing correlations on the watermarked image using the PN codes to extract the watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 9, Suzaki in view of Cox discloses the watermark information detecting apparatus according to claim 8, wherein the watermark information detector discriminates whether the watermark information is correctly detected according to at least one correlation peak value of the PN code sequences **(paragraph 102, Suzaki teaches determining if the watermark contains any noise information.)**

As per claim 11, Suzaki in view of Cox discloses the watermark information detecting apparatus according to claim 8, wherein the watermark information detector calculates correlation of two-dimensional array of PN code sequences, which include different PN code sequences in a row direction and a column direction **(paragraphs 19 and 56-60 and 103, Suzaki discloses the use of two-dimensional filters to determine the codes. Suzaki also teaches that these codes can be any dimension greater than or equal to 2, and that the two-dimensional version represents the height and width (column and row) of the watermark.)**,

so as to estimate the area occupied by the watermark information **(paragraphs 97-99, Suzaki teaches calculating the watermark area.)**

As per claim 12, Suzaki in view of Cox discloses the watermark information detecting apparatus according to claim 8, and wherein the watermark information detector calculates correlation of three-dimensional group of PN code sequences, which include different PN code sequences in a row direction and a column direction **(paragraphs 19 and 56-60 and 103, Suzaki discloses the use of two-dimensional filters to determine the codes. Suzaki also teaches that these codes can be any dimension greater than or equal to 2, and that the two-dimensional version represents the height and width (column and row) of the watermark.)**,

so as to estimate the area occupied by the watermark information **(paragraphs 97-99, Suzaki teaches calculating the watermark area.)**

However, Suzaki in view of Cox does not specifically state the use of a multipage document or watermarking a multipage document.

It would have been obvious to one of ordinary skill in the art at the time of the invention to insert a watermark into a multipage document. Suzaki, paragraph 56, teaches the use of N-dimensional (N >= 2) codes being used to insert a watermark into a single page document. If the two-dimensional codes represent the height and width of the watermark signal (page) as shown in Suzaki paragraph 60, then it would be obvious for the third dimension to be the page number and to insert a watermark into that multipage document.

As per claim 13, Suzaki in view of Cox disclose the watermark information detecting apparatus according to claim 8, wherein there is at least one dot pattern representing special watermark information **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to contain special information.)**

As per claim 15, Suzaki discloses a method of embedding watermark information, comprising:

generating a watermark image, the generating step including using a watermark information embedding apparatus to diffuse units of watermark information using a plurality of codes **(paragraphs 56-60, Suzaki teaches using multiple codes to generate a watermark.)**,

the diffused units of watermark information being redundantly denoted in the watermark image by dot patterns that are repeated at a plurality of locations **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to watermark an image from watermark information. Suzaki, Figure 11, also teaches that watermark information is repeated throughout the document image.)**;

combining the watermark image and a document image so as to generate a combined image **(paragraphs 45-46, Suzaki teaches generating the document and printing the document.)**;

and outputting the combined image to a printer **(paragraphs 45-46, Suzaki teaches generating the watermarked document and printing the watermarked document.)**

However, Suzaki also does not specifically state that the codes are PN codes.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

wherein the units of watermark information are represented by bits **(The watermark information must be stored as bits if it is to be used digitally.)**,

and wherein each bit of watermark information is diffused by representing the respective bit by one of the PN code sequences if the respective bit has a first value

and by representing the respective bit by a modified version of one of the PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code.)**;

and wherein the plurality of PN code sequences are used so as to diffuse the units of watermark information by assigning one of the PN code sequences to all of a row or column and assigning another of the PN code sequences to all of another row or column **(Cox, Figure 7, teaches using the plurality of PN codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns. Suzaki, Figure 3 and paragraphs 60-61, further teaches the codes being used to represent the height and width (column and row) of the watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 16, Suzaki in view of Cox disclose the method of embedding watermark information according to claim 15, wherein there is at least one dot pattern

representing special watermark information **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to contain special information.)**

As per claim 18, Suzaki discloses a method for detecting watermark information using a watermark information detecting apparatus to extract units of watermark information from document, the units of watermark information being represented by bits and being diffused by a plurality of codes in a watermark image **(paragraph 18-19, Suzaki teaches the use of a detecting apparatus to detect and extract watermark information. paragraphs 56-60, Suzaki teaches the use of the codes to embed watermark information. The watermark information must be stored as bits if it is to be used digitally.)**,

the method comprising the steps of: (a) scanning the document with a scanner to produce a scanned image **(Suzaki, paragraph 49, teaches using a scanner to produce an image.)**;

(b) extracting the watermark image, step (b) including detecting the diffused units of watermark information **(paragraphs 18-19, Suzaki teaches extracting the data by a correlation.)**;

(c) calculating correlations between the watermark image and the plurality of codes **(paragraphs 18-19, Suzaki teaches extracting the data by a correlation.)**;

and (c) estimating an area occupied by the watermark information according to steps (b) and (c) **(paragraphs 97-99, Suzaki teaches calculating the watermark area.)**.

However, Suzaki also does not specifically state that these codes are PN codes.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

and wherein each bit of watermark information is diffused by representing the respective bit by one of the PN code sequences if the respective bit has a first value and by representing the respective bit by a modified version of one of the PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code.)**;

wherein step (c) comprises using a first one of the PN code sequences to calculate correlations for all of a first row or column and using a second one of the PN code sequences to calculate correlations for all of a second one of the rows or columns **(Cox, Figure 3 and col. 5 lines 35-54, teaches performing correlations on the watermarked image using the PN codes to extract the watermark signal.)**

Cox further teaches calculating correlations between the watermark image and the plurality of PN codes **(Cox, Figure 3, teaches performing correlations to extract the original watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 19, Suzaki in view of Cox disclose the method of detecting watermark information according to claim 18, wherein there is at least a dot pattern representing special watermark information **(paragraphs 44, 56-61, Figure 3, and abstract, Suzaki teaches using dot patterns to contain special information.)**

As per claim 20, Suzaki discloses a method for generating a watermarked document comprising:

generating a watermark image, the generating step including diffusing units of watermark information and redundantly denoting the diffused units of watermark information by dot patterns that are repeated at a plurality of locations **(paragraphs 56-60, Suzaki teaches using codes to generate a watermark using dot patterns. Suzaki, Figure 11, also teaches that watermark information is repeated throughout the document image.)**;

combining the watermark image and a document image **(paragraph 45, Suzaki teaches obtaining a watermark document image by combining the watermark document and the document.)**;

and printing the document image onto a recording medium using a printer **(paragraphs 45-46, Suzaki teaches generating the watermarked document and printing the watermarked document.)**,

However, Suzaki also does not specifically state that these codes are PN codes.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of multiple PN codes to watermark a document.)**;

a watermark image generating section for diffusing units of watermark information using the PN code sequences **(Cox, col. 4 lines 39-65, teaches watermarking data using PN codes.)**,

wherein the units of watermark information are represented by bits **(The watermark information must be stored as bits if it is to be used digitally.)**,

wherein the units of watermark information are diffused using a plurality of PN code sequences, one of the sequences of PN code sequences being assigned to all of a row or column of the watermark information and another of the PN code sequences being assigned to all of another row or column of the watermark information **(Cox, Figure 7, teaches using the plurality of PN codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns. Suzaki, Figure 3 and paragraphs 60-61, further teaches the codes**

being used to represent the height and width (column and row) of the watermark signal.),

and wherein each bit of watermark information is diffused by representing the respective bit by one of the PN code sequences if the respective bit has a first value and by representing the respective bit by a modified version of the one of the PN code sequences if the respective bit has a second value **(Cox, col. 4 lines 39-65, teaches having a PN-mapper that maps each symbol (bit) of the watermark information to a pre-specified PN code, i.e. each bit will have a different PN code.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

As per claim 25, Suzaki discloses A watermark information embedding apparatus, comprising:

a document image generating section for generating a document image **(Suzaki, Figure 1 and paragraphs 42-43, teaches a document image formation portion to generate a document image.)**;

and generating a watermark image **(Suzaki, Figure 3, teaches generating a watermark image.)**;

a containing watermark document image synthesizer for overlapping the document image and the watermark image so as to generate a watermarked document image **(Suzaki, paragraph 45, teaches obtaining a watermark document image by combining the watermark document and the document.)**,

and a printer to print the watermarked document image onto a recording medium **(paragraphs 45-46, Suzaki teaches generating the watermarked document and printing the watermarked document.)**,

However, Suzaki does not specifically disclose the use of PN codes for watermarking.

Cox discloses a PN code generating section for generating a plurality of PN code sequences **(Cox, Figure 1 and col. 4 lines 39-50, teaches the use of a plurality of PN codes to watermark a document. Figure 7, further shows having multiple PN codes i.e. each PN code in the image is representing a PN code.)**;

a watermark image generating section for diffusing prescribed units of watermark information using the PN code sequences **(Cox, Figure 1 and col. 4 lines 39-65, teaches watermarking data using PN codes.)**

wherein the watermark image generating section utilizes the plurality of PN code sequences to represent the watermark information with respect to row units or column units of watermark information **(Cox, Figure 7, teaches using the plurality of PN**

codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns.),

with a first one of the PN code sequences being used to diffuse all of a first row or column units of watermark information and a second one of the PN code sequences being used to diffuse all of a second one of the row or column units of watermark information **(Cox, Figure 3 and col. 5 lines 35-54, teaches performing correlations on the watermarked image using the PN codes to extract the watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Suzaki by adding the teachings of Ogino because this would prevent the detection of the PN code in the watermark. By using multiple PN codes or the inverse PN code it will be much harder for an attacker to detect and remove the watermark to allow copying of the data **(See Ogino, col. 3 line 50-col. 9 line 21.)**

As per claim 26, Suzaki in view of Cox discloses The watermark information embedding apparatus according to Claim 25, wherein the watermark image generating section assigns one of the PN code sequences to a row or column, and switches to another of the PN code sequences with respect to another row or column **(Cox, Figure 7, teaches using the plurality of PN codes to watermark a document. The dots in the Figure are representational of the PN codes and are in different rows and columns.)**

As per claim 27, Suzaki discloses A watermark information detecting apparatus for extracting watermark information from rows and columns of a document, in which the watermark information is diffused by code sequences and the diffused watermark information is recorded as a watermark image, comprising:

a scanner for scanning the document to produce a scanned image **(Suzaki, paragraph 49, teaches scanning a document.)**;

and a watermark information detector which makes an explicit record area of the watermark information by extracting the watermark image from the scanned image and by calculating correlation of the code sequences with respect to the watermark image **(Suzaki, paragraphs 18-19, teaches detection and extraction of the watermark image by using a correlation.)**,

However, Suzaki does not specifically teach using PN codes with watermarking.

Cox discloses using PN codes to embed and detect watermarks **(Cox, Figures 2-3, teaches embedding and extracting watermarks using PN codes.)**,

and wherein the watermark information detector calculates correlation values using different PN code sequences, detects a correlation peak value of each PN code sequence, and estimates row addresses or column addresses according to the correlation peaks **(Cox, Figure 3, teaches performing correlations on the watermarked image to extract the watermark signal. Suzaki, paragraphs 19, 103-104, further teaches the use of a filter to detect the watermark information on the watermarked document. Figures 17 and 18 also teach the recovering of the codes (row and column) that were used to embed the watermark. Therefore, the**

combination teaches recovering the PN codes to determine the rows and columns that contain the watermark information.),

wherein a first one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a first one of the rows or columns and a second one of the PN code sequences is used by the watermark information detector to calculate correlation values for all of a second one of the rows or columns **(Cox, Figure 3 and col. 5 lines 35-54, teaches performing correlations on the watermarked image using the PN codes to extract the watermark signal.)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Suzaki's teachings with the teachings of Cox because this would this would increase the security and data integrity of the generated watermark. If PN codes are used to watermark a document, the document and corresponding watermark information can be retrieved even if the document has undergone slight changes **(See US Patent 6031914, col. 2 lines 38-42, Tewfik teaches the need to hide the watermark to survive data manipulations and PN codes will allow for this.)**

12. **Claims 22 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzaki in view of Cox and further in view of Ogino et al. (US Patent 6058243) hereinafter referred to as Ogino.

As per claims 22 and 24, Suzaki in view of Cox does not specifically disclose having a PN code and an inverted PN code.

Ogino discloses said one of the PN code sequences includes a particular PN code and the modified version of said one of the PN code sequences has bits that are inverted from the bits of the particular PN code **(Ogino, Figure 1 and col. 9 lines 20-33, teaches having a PN code inverter that determines if the output PN code should be inverted or not based on an inverse timing signal.)**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Suzaki by adding the teachings of Ogino because this would prevent the detection of the PN code in the watermark. By using multiple PN codes or the inverse PN code it will be much harder for an attacker to detect and remove the watermark to allow copying of the data **(See Ogino, col. 3 line 50-col. 9 line 21.)**

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. King whose telephone number is (571)270-7310. The examiner can normally be reached on Mon. - Fri. 7:30 AM - 4:00 PM est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on (571) 272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John B King/
Examiner, Art Unit 2435

/Kimyen Vu/
Supervisory Patent Examiner, Art Unit 2435